

Information to Discharge Conditions 22 & 23 of Planning Permission ref. P/2022/0448 relating to Soil Handling

Condition 22:

No stripping or handling of topsoil or subsoil shall take place within the Site unless a scheme of soil movement and soil management has been submitted to and approved in writing by the Mineral Planning Authority. The approved scheme shall clearly identify the origin, intermediate and final locations of soils for use in agricultural restoration together with details of quantities, depths and areas involved. The development shall be implemented in accordance with the approved scheme.

Condition 23:

Topsoil, subsoil and soil making material shall only be stripped when they are in a dry and friable condition, and no movement of soils shall occur:

- (a) During the months October to April (inclusive), unless otherwise agreed in writing with the Mineral Planning Authority; or
- (b) When the upper 1200mm of soil has a moisture content which is equal to or greater than that at which the soil becomes plastic, tested in accordance with the ‘Worm Test’ as set out in BS 1377:1975 – ‘British Standard Methods Test for Soils for Civil Engineering Purposes’; or
- (c) When there are pools of water on the soil surface.

Introduction

The following information provides a scheme for soil movement and management associated with permitted Extension Area A, and has been prepared to ensure full accordance with The Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021).

- SHEET 1: Introduction**
- SHEET 2: Current Soil Resource and Locations** (including volumetric quantities)
- SHEET 2: Progressive Soil Stripping and Replacement Scheme - Temporary Storage Locations within Bunds and Progressive Phased Placement for Restoration** (including volumetric quantities)
- SHEET 3: Progressive Soil Stripping and Replacement Scheme & Restoration Soil Profile**
- SHEET 4 - 5: Scheme for Soil Handling, Storage and Placement**

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The information provided below illustrates the current soils resource and the location of soils to be stripped (Figure 1), the phasing of soils stripping and the location of temporary soil storage bunds (Figure 2), together with the restoration of Area A (Figure 3). Detailed methods of soils handling, storage and placement, together with a specification for temporary seeding and management, is provided on Sheets 3 to 5 of this document. All information being within full accordance with The Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021).



Current Situation In-situ Soil Resource

Topsoil - Average Thickness of 350mm x 4.1Ha = 14,350m³

The topsoil is a dark brown, slightly stony, medium sandy loam with a fine, medium subangular blocky structure and a friable consistency.

Upper Subsoil - Average Thickness of 150mm x 4.1Ha = 6,150m³

The upper subsoil is a brown or dark brown, slightly stony, loamy medium sand or medium sand, with a granular structure and a friable consistency.

Lower Subsoil - Average Thickness of 700mm x 4.1Ha = 28,700m³

The lower subsoil is a brown or reddish brown, moderately stony, sandy clay loam with a fine subangular structure and a friable consistency.

Total Soil Resource based upon 1.2m profile = 49,200m³

Please refer to Reading Agricultural Consultants submitted report Appendix 2 for details of the nature of the soil resources and ALC.

The soils in Area A are consistent and are well drained in Wetness Class I.

They are classified as Grade 2 due to a soil droughtiness limitation.



Initial Soils / Stripping Proposals

Soil Stripping Operations

The initial soil strip within Area A – ‘Phase 1’ will comprise a 60m strip, running from the eastern boundary of the existing quarry. This will allow a full length quarry face to be available to extract the very variable areas of in-situ sand and gravel. See Figure 2 (left).

Soils from this initial strip will be placed in dump trucks and transported within the quarry for temporary storage in three separate bunds – see Figure 3 (right).

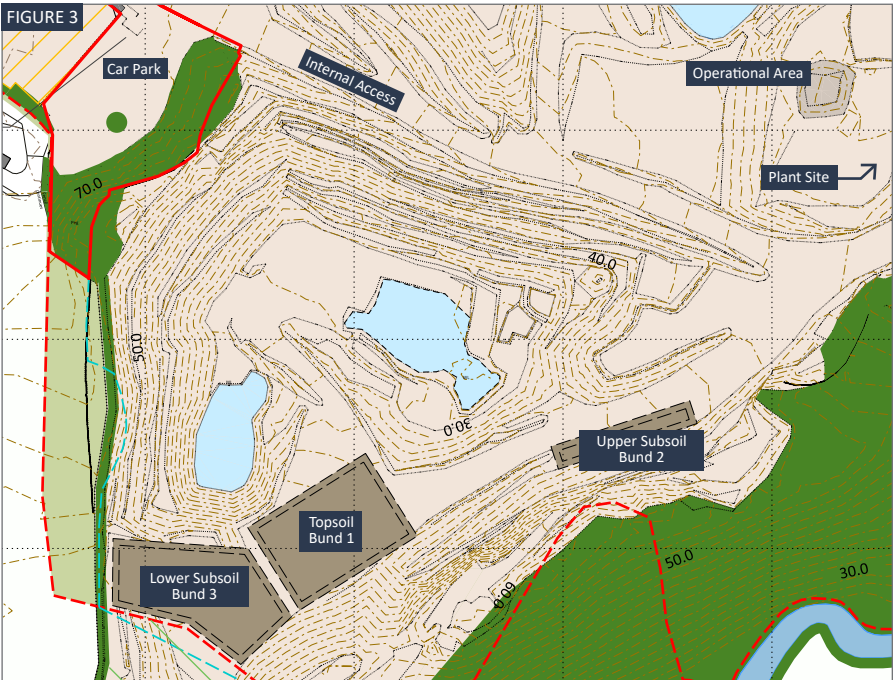
Topsoil Bund 1: 8,610m³

Upper Subsoil Bund 2: 3,690m³

Lower Subsoil Bund 3: 17,220m³

At this point in time, a total of 29,520m³ of the Area A soil resource will be in temporary storage bunds (this equates to ~60% of the soil resource) and ~19,680m³ will remain in-situ (this equates to ~40% of the soil resource).

No upper subsoil will be stored on in-situ topsoil. No lower subsoil will be stored on either in-situ topsoil or upper subsoil. No topsoil bund to be above 3m in height. No upper or lower subsoil bund to be above 5m in height. If for operational reasons surface space for temporary bunds within the extension area is tight, the bunds will be placed on adjacent land within the quarry void.



Ballswood Quarry: Changes to the Limit of Extraction within the Existing Planning Permission Boundary Relating to Permitted Extraction Area A

Sheet 3



Second Stage 'Phase 2' of Soil Stripping

Figure 4 (left) illustrates the second stage of soil stripping where by a series of progressive ~20m wide strips will take place ahead of the progressively extracted eastern face to release mineral. The stripped soils will be able to be directly placed for restoration onto the created restoration formation levels established within the Initial Works area. This area will have been extracted at this point in time with final restoration formation levels in place to accept the progressively stripped soil profile of 700mm Lower Subsoil, 150mm Upper Subsoil and 350mm Topsoil i.e. the profile of the current in-situ soils.

Upon completion of all mineral extraction within Area A (approximately a 12 month process), the eastern area of the site will be restored to the permitted restoration formation levels. The soil resource held in Temporary Bunds 1, 2 and 3, will then be replaced to complete the soils restoration placement of 700mm Lower Subsoil, 150mm Upper Subsoil and 350mm Topsoil i.e. the profile of the current in-situ soils.

Soil profile thicknesses will be monitored during the stripping, temporary storage and replacement process, and volumetric records provided to the Mineral Planning Authority to ensure the protection and management of the soil resource.

All stripped soils will be replaced to restore the Extension Area A restoration soil profile. By re-using the original soils and replacing the full depth of the soil profile to 1.2m using good practice techniques, the restored soil will be returned to Grade 2 agricultural land.



Restoration of Extension Area A

The overburden / fill required to restore Area A will be approximately 181,693m³. This material will be obtained from both any interburden / non processable mineral from within Area A and available overburden / fill material from the existing quarry. This material will be placed progressively as space becomes available alongside the progressive mineral extraction within Area A, to achieve restoration formation levels. As highlighted above, onto the restoration fill formation levels, all of the original soils which have been temporarily stored, will be placed.

All restored agricultural land will then be seeded and placed into a 5 Year Aftercare and Management period, in accordance with Minerals Technical Advice Note MTAN 97.

Ballswood Quarry

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Detailed Methods of Soils Handling, Storage and Placement

Temporary Bund Seeding

Bunds should be sown with grass to help maintain biological activity and prevent water erosion if in situ for greater than three months. The following seed mix is to be sown on temporary bunds:

Species	Common Name	%
Festuca rubra	Strong Creeping Red Fescue	30
Festuca pratensis	Meadow Fescue	25
Cynosurus cristatus	Crested Dogstail	25
Alopecurus pratensis	Meadow Foxtail	10
Descampsia cespitosa	Tufted Hair Grass	10

Seed to be broadcast by hand in late summer / early autumn at a rate of 4g/m².

To establish a thick, healthy sward, bunds will be strimmed twice a year, in May and September. The brash to be removed from the bund in order to limit the loss of sward. If notable weeds are found to establish, they are to be treated with an approved herbicide.

Outline Soil Handling - Stripping, Movement & Placement for Restoration

Soil stripping movement and placement (soil handling techniques) are to be carried out in full in accordance with The Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021). The objective being to ensure that all soils shall be handled when they are in a reasonably dry and friable state, which is when they will be least susceptible to lasting damage by compaction and smearing.

Soils will be handled using hydraulic excavators, and articulated dump trucks. The equipment will be used for soil stripping, placement in store and excavation from store for restoration purposes (replacement), in accordance with The Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021), quoting **Sheets A, B and C** of The Good Practice Guide for Handling Soils in Mineral Workings (2021) as follows:

Sheet A	Soil stripping with excavators and dump trucks
Sheet B	Building soil storage mounds with excavators and dump trucks
Sheet C	Excavation of soil storage mounds with excavators and dump trucks

Soils will only be stripped / moved when in a dry and friable condition, avoiding soil handling during and shortly after significant rainfall.

In light drizzle, soil handling may continue for up to 4 hours unless the soils are already at / near their moisture limit.

In light rain, soil handling must cease after 15 minutes. In heavy rain and intense showers, handling shall cease immediately.

Soil tests are to be undertaken in the field. Samples shall be taken from at least 5 locations in the soil handling area and at each soil horizon to the full depth of the profile to be recovered/replaced. The tests shall include visual examination of the soil and physical assessment of the soil consistency.. The tests shall include Examination and Consistency.

The **Examination Test** is as follows:

- If the soil is wet, films of water are visible on the surface of soil particles or aggregates (e.g. clods or peds) and/or when a clod or ped is squeezed in the hand it readily deforms into a cohesive ‘ball’ means **no soil handling to take place**.
- If the samples is moist (i.e. there is a slight dampness when squeezed in the hand) but it does not significantly change colour (darken) on further wetting, and clods break up/crumble readily when squeezed in the hand rather than forming into a ball means **soil handling can take place**.
- If the sample is dry, it looks dry and changes colour (darkens) if water is added, and it is brittle means **soil handling can take place**.

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The **Consistency Test** is as follows:

First test - Attempt to mould soil sample into a ball by hand;

- Impossible because the soil is too dry and hard or too loose and wet means **soil handling can take place.**
- Impossible because the soil is too loose and wet means **no soil handling can take place.**
- Possible – go to next test

Second test- Attempt to roll into a 3mm diameter thread by hand;

- Impossible because soil crumbles or collapses means **soil handling can take place.**
- Possible means **no soil handling can take place.**

Soils will be transported on specific haul routes, tracking only on the void / overburden placement surface.

In order to avoid compaction and other damage to soils during restoration operations the Sequential Bed / Strip Practice method of loose tipping will be used - in accordance with Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021) **Sheet D - Soil Replacement with Excavators and Dump Trucks - Sequential Bed / Strip Practice**

The restoration formation levels will be achieved via the placement of site overburden materials prior to the replacement of previously stripped and stored site soils. It is confirmed that comprehensive ripping of the base formation material will take place to aid drainage and avoid soil wetness / drought issues post soil placement Subject to acceptance of the above Examination and Consistency tests, to ensure handling is ok, soils will be transported by dump trucks running over the placed overburden material and end tipped in sequential strips. These are to be levelled out using an excavator. The excavator and dump trucks are only to stand, work and travel on the basal/formation layer. The principal objective being to avoid compaction and the need for further trafficking / ripping of soils. If there any residual surface compaction, treatment will need to be integrated in to the replacement process as will the need for the removal of stones or non-soil debris. See Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying 2021) **Sheet L & O** relating to the removal of stones and non-soil debris. Where these treatments are deployed, to minimise additional compaction / recompaction, no machinery is to traverse the placed soils. The dump truck being loaded with the recovered stones/debris stand, travelling on the untreated basal layer.

Topsoil will be delivered by dump truck and placed in sequential strips with the subsoil layer(s) replaced first, followed by the topsoil layer; each layer being replaced to the specified thickness. The next strip is not to be started until the profile in the current strip is completed. This is often referred to as the ‘bed’ or ‘strip’ system which involves the progressive sequential laying of the soil in strips across the area to be restored.

To ensure that the restoration scheme succeeds, a programme of supervision, monitoring and reporting will take place. Regular auditing will ensure soils are utilised sustainably. At the commencement and completion of any soil stripping phases an audit is to take place of all soils stripped, type of topsoil/other soils materials, and associated volumes, together with a corresponding audit of all soils both placed direct for restoration and/or temporarily held in store for later use in restoration.

On completion of soil replacement, restoration cultivation will be carried out.